

COMPARATIVE STUDY BETWEEN EARLY AND LATE LAPAROSCOPIC CHOLECYSTECTOMY IN TREATMENT OF ACUTE CHOLECYSTITIS IN BUNDELKHAND REGION

RAMESH CHANDRA ARUN, MANOJ KUMAR*

Department of General Surgery, Rani Durgavati Medical College, Banda, Uttar Pradesh, India.

*Corresponding author: Manoj Kumar; Email: drmanojmahor2016@gmail.com

Received: 02 April 2024, Revised and Accepted: 14 May 2024

ABSTRACT

Objective: Laparoscopic cholecystectomy is considered the procedure of choice for patients presenting with acute cholecystitis. The following study is an attempt to compare the outcome and operative complications of early versus late laparoscopic cholecystectomy in patients presenting with acute cholecystitis in a tertiary care center in Banda district of bundelkhand region.

Methods: The present study involved a review of case records of 80 patients with the clinical diagnosis of acute cholecystitis, admitted in the surgical wards of a tertiary care center of Banda district during the period from January 2023 to December 2023 who underwent laparoscopic cholecystectomy on an elective basis. Participants were divided into two groups, Group A (early laparoscopic cholecystectomy) and Group B (delayed laparoscopic cholecystectomy) containing 40 patients each. The hospital records of these patients were reviewed and analyzed.

Results: The present study showed statistically significant differences in age distribution and duration of surgery. The average duration of surgery was 42.3 ± 8.97 min in Group "A" and 53.5 ± 9.87 min for Group "B." Male-to-female ratio was 2:1. The rate of conversion was found to be 2.5% in Group "A" as compared to 10% in Group "B." Post-operative complications such as wound infection and biliary leakage were more common in Group "B" in comparison of Group "A."

Conclusion: Early cholecystectomy can be considered a safe and better method of treatment for acute cholecystitis due to its shorter hospital stay, avoidance of readmission to hospital, and decreased overall costs of treatment which is a major economic benefit to both the patient and health care system in comparison of late cholecystectomy.

Keywords: Early cholecystectomy, Laparoscopic cholecystectomy, Conversion rate, Complication.

© 2024 The Authors. Published by Innovare Academic Sciences Pvt Ltd. This is an open access article under the CC BY license (<http://creativecommons.org/licenses/by/4.0/>) DOI: <http://dx.doi.org/10.22159/ajpcr.2024v17i7.51349>. Journal homepage: <https://innovareacademics.in/journals/index.php/ajpcr>

INTRODUCTION

The prevalence of cholesterol gallstones has increased exponentially throughout the world, especially in obese people. This expanded predominance of stones is generally due to supersaturation of bile with cholesterol [1]. Laparoscopic cholecystectomy is considered gold standard treatment of choice in the management of calculus gallbladder disease. Laparoscopic cholecystectomy consists advantages over open cholecystectomy which include decreased operative stress; less post-operative pain, early mobilization, and a shorter hospital stay [2]. Conventional treatment of acute cholecystitis includes administration of intravenous antibiotics and analgesics to prevent possible complications associated with inflammation followed by elective laparoscopic cholecystectomy after 4–6 weeks.

As per Tokyo guidelines [3], an early laparoscopic cholecystectomy (ELC) is necessary for patients with mild cholecystitis whereas delayed laparoscopic cholecystectomy (DLC) can be performed in patients with moderate or severe cholecystitis. Various studies suggest that early cholecystectomy has the advantage in terms of shorter hospital stay, avoidance of readmission to hospital, and decreased overall costs of treatment [4]. Despite these recommendations, ELC for acute cholecystitis is not being performed regularly because the timing and approach to the surgical management in these patients is still a matter of controversy. The following study is an attempt to compare the outcome and operative complications of early versus DLC in patients presenting with acute cholecystitis in a tertiary care center.

METHODS

Present study was conducted in the department of surgery of a tertiary care hospital in Banda district of Bundelkhand region during the period of 1 year, that is from January 2023 to December 2023. This study reviewed the case records of 80 patients having a clinical diagnosis of acute cholecystitis, admitted in the surgical wards of a tertiary care hospital. These patients underwent laparoscopic cholecystectomy (standard four ports) on an elective basis.

Following two criteria were used to define acute cholecystitis in the present study:

1. Clinical: Right upper quadrant pain with tenderness (Murphy's sign).
2. Sonological: Cholelithiasis (Single/multiple/sludge GB Calculi), thickened GB wall (>3 mm), pericholecystic collection, sonographic Murphy's sign.

Patients having age group between 15 and 70 years with symptomatic gallstone disease/biliary colic pain/acute cholecystitis were included while patients having suspected common bile duct stone/Gall stone induced pancreatitis/suspected concomitant acute cholangitis/asymptomatic gall stone disease/previous upper abdominal surgery, etc. were excluded from study.

Participants were divided into two groups, Group A (ELC) and Group B (DLC) containing 40 patients each. The hospital records of these patients were reviewed and analyzed. Data collection was done using a structured predesigned pro forma containing a checklist which includes variables such as patient demographic profile,

relevant history (history of jaundice, alcoholic liver disease, diabetes, frequency of episodes of cholecystitis, pancreatitis, etc.), clinical findings, biochemical and radiological investigations, operative time, intraoperative details, post-operative complications, and duration of total hospital stay.

Collected data were entered in MS Excel and analyzed by Epi Info software. Comparison of quantitative variables between groups such as mean age, mean duration of surgery, mean hospital stay, etc. were done using unpaired student's "t" test, whereas comparison of qualitative variables such as gender, complications of surgery, and conversion to open surgery were done using Chi-square test or Fisher's exact test. The significance level was determined at $p < 0.05$.

RESULTS

As depicted in Table 1, the study groups, which underwent early and DLC, showed differences in age distribution and duration of surgery. The mean age in ELC group was 32.7 ± 7.68 while in Late laparoscopic cholecystectomy (LC) group was 42.82 ± 13.26 . Mean operating time in Group "A" was 42.3 ± 8.97 while in Group "B" was 53.5 ± 9.87 . In our study, out of 80 patients, 51 (63.75%) were female and 29 (36.25%) were male, and female and male ratio is about 2:1.

Table 2 depicts the comparison of chief complaints of patients in both groups, that is, Group A and Group B. In Group "A" right hypochondrial pain was present in all cases while in Group "B," pain was present in only 15% of cases.

As depicted in Table 3, in Group "A" 95% of patients have distended gall bladder and 90% multiple gall bladder stones on ultrasonography (USG) examination. All patients showed >3 mm gall bladder wall thickness on USG. While in Group "B" only 42.5% of patients showed distended gall bladder and 82.5% multiple gall bladder stones on USG examination.

Table 1: Comparison of demographic profile of patients in both groups

Variables	Early LC (n=40)	Late LC (n=40)	p
Age	32.7 ± 7.68	42.82 ± 13.26	0.006
Gender, n (%)			
Male	14 (17.5)	15 (18.75)	0.06
Female	26 (32.5)	25 (31.25)	
Hospital stay duration (days)	3.54 ± 1.98	6.12 ± 3.04	0.168
Duration of pain (h)	1.81 ± 0.34	1.7 ± 0.37	0.672
Operation time (min)	42.3 ± 8.97	53.5 ± 9.87	0.0001

LC: Laparoscopic cholecystectomy

Table 2: Comparison of complaints of patients in both groups

Complaints	Early LC (n=40), n (%)	Late LC (n=40), n (%)
Right hypochondrial pain		
Present	40 (100)	6 (15)
Absent	0	34 (85)
Fever		
Present	10 (25)	4 (10)
Absent	30 (75)	36 (90)
Nausea		
Present	14 (35)	3 (7.5)
Absent	26 (65)	37 (92.5)
Vomiting		
Present	27 (67.5)	1 (2.5)
Absent	13 (32.5)	39 (97.5)
Jaundice		
Present	3 (7.5)	4 (10)
Absent	37 (92.5)	36 (90)

LC: Laparoscopic cholecystectomy

About 87.5% of patients showed >3 mm gall bladder wall thickness on USG. Similar findings were observed in a study done by Thami *et al.*

Table 4 depicts comparison of the conversion rate to open cholecystectomy in both groups. The conversion rate observed for the early laparoscopic group was 2.5% as compared to 10% in delayed laparoscopic group. It showed no significant differences between early and late laparoscopic cholecystectomy groups ($p > 0.05$).

As depicted in Table 5, biliary leakage was observed in one case of the late laparoscopic cholecystectomy group, and wound infection was seen in three cases of Group "B."

DISCUSSION

Laparoscopic cholecystectomy has become the procedure of choice in cases of acute cholecystitis. The timing of cholecystectomy in acute cholecystitis has been a contentious issue for a long time among surgeons.

Table 3: Comparison of demographic profile of patients in both groups

USG findings	Early LC (n=40), n (%)	Late LC (n=40), n (%)
Gall bladder size		
Distended	38 (95)	17 (42.5)
Normal	2 (5)	23 (57.5)
Gall bladder wall thickness (>3 mm)		
Thickened	40 (100)	35 (87.5)
Normal	0	5 (12.5)
Gall bladder stones		
Multiple	36 (90)	33 (82.5)
Solitary	4 (10)	7 (17.5)
Common bile duct		
Dilated	0	0
Normal	40 (100)	40 (100)
IHBR		
Dilated	0	0
Normal	40 (100)	40 (100)

IHBR: Intrahepatic biliary radical, LC: Laparoscopic cholecystectomy, USG: Ultrasonography

Table 4: Comparison of conversion rate to open cholecystectomy in both groups

Conversion rate	Early laparoscopic cholecystectomy (n=40)	Late laparoscopic cholecystectomy (n=40)	p
Successful LC	39	36	0.06
Conversion to OC	1	4	
Conversion rate (%)	2.5	10	

LC: Laparoscopic cholecystectomy, USG: Ultrasonography

Table 5: Comparison of operative complications in both groups

Complications	Early LC (n=40), n (%)	Late LC (n=40), n (%)
Intraoperative		
Common bile duct injury	1 (2.5)	1 (2.5)
Visceral injury	0	0
Adhesion found	0	6 (15)
Post-operative		
Biliary leakage	0	1 (2.5)
Wound infection	1 (2.5)	3 (7.5)

LC: Laparoscopic cholecystectomy

As depicted in Table 1, the study groups, which underwent early and DLC, showed differences in age distribution and duration of surgery. Study done by Kolla *et al.* [5] and Thami *et al.* [6] also reported mean age groups, that is, 40 years and 40.2 years respectively which is similar to the present study. In the present study, female and male ratio is about 2:1 which is comparable with study done by Cameron *et al.* [7] observed female to male ratio of 2.3:1.

In our study, complaints of abdominal pain, fever, nausea, and vomiting were more common in Group "A" in comparison of Group "B." De Camp *et al.* [8] observed in their study that the majority of the patients with acute cholecystitis presented with pain abdomen (99.7%) which is similar to findings observed in the present study.

Various studies (Cameron *et al.* [7], De Camp *et al.* [8], Somasekar *et al.* [9]) advocated early cholecystectomy in patients with acute cholecystitis. Decreased total duration of hospital stay, decreased morbidity, avoids readmission to the hospital, and decreased overall costs of treatment were reasons observed by them in their studies. The 2013 Tokyo guidelines [3] support early cholecystectomy on first presenting admission as the optimal management strategy for patients with mild (Grade I) and moderate (Grade II) acute cholecystitis.

In the present study, the conversion rate from laparoscopic to open surgery was one out of 40 (2.5%) in early Group "A" versus four out of 40 (10%) in Group "B." No significant differences between early and late laparoscopic cholecystectomy groups were observed regarding the conversion rate from laparoscopic to open surgery in the present study ($p > 0.05$). Studies done by Johansson *et al.* [10], Kolla *et al.* [5], Verma *et al.* [11] also observed insignificant differences in conversion rates between both groups which are consistent with the result of present study.

Yadav *et al.* [12] in their randomized clinical study in patients with acute calculus cholecystitis found that average operating time in ELC group was significantly longer than the late laparoscopic cholecystectomy group (57.8 min vs. 66.7 min, $p < 0.05$). In the present study, the average duration of surgery was 42.3 ± 9.97 min in Group "A" and 53.5 ± 9.87 min for Group "B" which is comparable with the study done by Yadav *et al.*

Wound infection, biliary leakage, prolonged ileus, and fever are the main post-operative complication associated with both early and delayed cholecystectomy in acute cholecystitis. Bile duct injury as an intraoperative complication is of major concern in both groups. Johansson *et al.* [10] and Kolla *et al.* [5] reported an insignificant difference in wound infection rate between the early and delayed surgery group in acute cholecystitis. Verma *et al.* [11] and Gul *et al.* [13] reported insignificant differences in overall complication rate in both groups. Saber and Hokkam [14] found a higher but not significant overall complication rate in ELC group. In the present study, wound infection rate was observed 2.5% and 7.5%, respectively, in both groups which are consistent with above-mentioned studies.

In our study, mean total hospital stay was 3.54 ± 1.98 days in Group "A" and 6.12 ± 3.04 days for Group "B." Gurusamy *et al.* [15] reported 4 days shorter total hospital stay in the early cholecystectomy group in comparison with delayed group. Papi *et al.* [16] in their meta-analysis study also reported shorter total hospital stay in the early surgery group in comparison of the delayed group (9.6 ± 2.5 days vs. 17.8 ± 5.8 days; $p < 0.0001$).

In the present study, there was no mortality seen in both groups which is consistent with Misra *et al.* [17] who also observed no mortality in their study.

CONCLUSION

Early cholecystectomy can be considered a safe and better method of treatment for acute cholecystitis due to its shorter hospital stay, avoidance of readmission to hospital, and decreased overall costs of

treatment which is a major economic benefit to both the patient and health-care system in comparison of late cholecystectomy. However, early cholecystectomy should be considered as a planned procedure following adequate resuscitation and a complete assessment of the associated comorbidity through the investigation and confirmation of the diagnosis.

ACKNOWLEDGMENTS

None

AUTHORS' CONTRIBUTIONS

None

COMPETING INTERESTS

None

FUNDING

None

REFERENCES

- Watters CR. Basic techniques of laparoscopic cholecystectomy. In: Atlas of Laparoscopic Surgery. 2nd ed. Philadelphia, PA: Current Medicine; 1996. p. 71-7.
- Strasberg SM. Clinical practice. Acute calculous cholecystitis. *N Engl J Med.* 2008;358(26):2804-11. doi: 10.1056/NEJMc0800929, PMID: 18579815
- Takada T, Strasberg SM, Solomkin JS, Pitt HA, Gomi H, Yoshida M, *et al.* TG13: Updated Tokyo guidelines for the management of acute cholangitis and cholecystitis. *J Hepatobiliary Pancreat Sci.* 2013;20(1):1-7. doi: 10.1007/s00534-012-0566-y, PMID: 23307006
- Overby DW, Apelgren KN, Richardson W, Fanelli R, Society of American Gastrointestinal and Endoscopic Surgeons. SAGES guidelines for the clinical application of laparoscopic biliary tract surgery. *Surg Endosc.* 2010;24(10):2368-86. doi: 10.1007/s00464-010-1268-7, PMID: 20706739
- Kolla SB, Aggarwal S, Kumar A, Kumar R, Chumber S, Parshad R, *et al.* Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: A prospective randomized trial. *Surg Endosc.* 2004;18(9):1323-7. doi: 10.1007/s00464-003-9230-6, PMID: 15803229
- Thami G, Kansal R, Singla DK, Agrawal N. Comparative study between early and late laparoscopic cholecystectomy in the treatment of acute cholecystitis. *Int J Contemp Med Res.* 2022;9(1):A9-12.
- Cameron IC, Chadwick C, Phillips J, Johnson AG. Acute cholecystitis-room for improvement? *Ann R Coll Surg Engl.* 2002;84(1):10-3. PMID: 11890619
- DeCamp PT, Ochsner A, Baffes TG, Bancroft H, Bendel W. Timing in the surgical treatment of acute cholecystitis. *Ann Surg.* 1952;135(5):734-50. doi: 10.1097/0000658-195205000-00018, PMID: 14924529
- Somasekar K, Shankar PJ, Foster ME, Lewis MH. Costs of waiting for gall bladder surgery. *Postgrad Med J.* 2002;78(925):668-9. doi: 10.1136/pmj.78.925.668, PMID: 12496322
- Johansson M, Thune A, Blomqvist A, Nelvin L, Lundell L. Management of acute cholecystitis in the laparoscopic era: Results of a prospective, randomized clinical trial. *J Gastrointest Surg.* 2003;7(5):642-5. doi: 10.1016/s1091-255x(03)00065-9, PMID: 12850677
- Verma S, Agarwal PN, Bali RS, Singh R, Talwar N. Early versus delayed laparoscopic cholecystectomy for acute cholecystitis: A prospective randomized trial. *ISRN Minim Invasive Surg.* 2013;2013:4861071-3. doi: 10.1155/2013/486107
- Yadav RP, Adhikary S, Agrawal CS, Bhattarai B, Gupta RK, Ghimire A. A comparative study of early vs. Delayed laparoscopic cholecystectomy in acute cholecystitis. *Kathmandu Univ Med J (KUMJ).* 2009;7(25):16-20. doi: 10.3126/kumj.v7i1.1759, PMID: 19483447
- Gul R, Dar RA, Sheikh RA, Salroo NA, Matoo AR, Wani SH. Comparison of early and delayed laparoscopic cholecystectomy for acute cholecystitis: Experience from a single center. *N Am J Med Sci.* 2013;5(7):414-8. doi: 10.4103/1947-2714.115783, PMID: 24020050
- Saber A, Hokkam EN. Operative outcome and patient satisfaction in early and delayed laparoscopic cholecystectomy for acute cholecystitis. *Minim Invasive Surg.* 2014;2014:162643. doi: 10.1155/2014/162643,

- PMID: 25197568
15. Gurusamy KS, Junnarkar S, Farouk M, Davidson BR. Cholecystectomy for suspected gallbladder dyskinesia. *Cochrane Database Syst Rev.* 2009;1(1):CD007086. doi: 10.1002/14651858.CD007086.pub2, PMID: 19160318
 16. Papi C, Catarci M, D'Ambrosio L, Gili L, Koch M, Grassi GB, *et al.* Timing of cholecystectomy for acute calculous cholecystitis: A meta-analysis. *Am J Gastroenterol.* 2004;99(1):147-55. doi: 10.1046/j.1572-0241.2003.04002.x, PMID: 14687156
 17. Misra MC, Khanna S, Khosla A, Berry M, Kapur BM. Emergency versus elective cholecystectomy in acute cholecystitis. *Jpn J Surg.* 1988;18(4):384-9. doi: 10.1007/BF02471461, PMID: 3050215